

What is claimed is:

[Claim 1] 1. An optical recording apparatus comprising:

an optical pickup unit for generating and directing optical signals onto an optical medium, and for detecting corresponding reflected optical signals from the optical medium;

a focus motor for moving a focusing lens on the optical pickup according to a focus signal to thereby adjust a defocus value of the optical signals on the optical medium; and

a focus controller for generating the focus signal;

wherein during write operations of the optical recording apparatus, the focus controller is for performing write defocus calibration on the optical medium to determine an optimal write defocus value for the optical medium.

[Claim 2] 2. The optical recording apparatus of claim 1, wherein during read operations of the optical recording apparatus, the focus controller is further for determining an optimal read defocus value for the optical medium.

[Claim 3] 3. The optical recording apparatus of claim 1, wherein the optical medium is an optical disc having multiple layers; and during write operations of the optical recording apparatus on a particular layer of the optical disc, the focus controller is for performing write defocus calibration on the particular layer of the optical disc to determine the optimal write defocus value for the particular layer of the optical disc.

[Claim 4] 4. The optical recording apparatus of claim 1, further comprising a non-volatile storage unit for storing a plurality of mappings relating different types of optical media to different write defocus values.

[Claim 5] 5. The optical recording apparatus of claim 4, wherein during write operations of the optical recording apparatus, the focus controller is for performing the write defocus calibration starting from a starting write defocus value being a write defocus value stored in the non-volatile storage unit corresponding to the type of the optical medium.

[Claim 6] 6. The optical recording apparatus of claim 5, wherein if the non-volatile storage unit does not include a write defocus value stored therein corresponding to the type of the optical medium, the focus controller is for performing the write defocus calibration starting from an optimal read defocus value corresponding to the type of the optical medium or starting from a default defocus value.

[Claim 7] 7. The optical recording apparatus of claim 5, wherein during write defocus calibration on the optical medium, the focus controller is for performing a plurality of optimal power calibrations at different defocus values to gather a data set relating write power of the optical signals to performance indicators at each of the different defocus values, wherein one of the different defocus values is the starting write defocus value.

[Claim 8] 8. The optical recording apparatus of claim 7, wherein the optical medium is an optical disc, and the optimal power calibrations are performed on any area of the optical disc.

[Claim 9] 9. The optical recording apparatus of claim 7, wherein the performance indicators include jitter or a block error rate of the reflected optical signals from the optical medium.

[Claim 10] 10. The optical recording apparatus of claim 7, wherein during write defocus calibration on the optical medium, the focus controller is for choosing the optimal write defocus value according to the data set, the optical write defocus value being a particular defocus value of the different defocus values of the data set having an optimal combined performance criteria.

[Claim 11] 11. The optical recording apparatus of claim 5, wherein if the optimal write defocus value resulting from the write defocus calibration is different than the starting write defocus value, the focus controller is further for updating the non-volatile storage unit with an updated write defocus value for the type of the optical medium.

[Claim 12] 12. The optical recording apparatus of claim 11, wherein the updated write defocus value for the type of the optical medium is a value between the starting write defocus value and the optimal write defocus value.

[Claim 13] 13. A method of focusing optical signals onto an optical medium in an optical recording apparatus, the method comprising:

providing an optical pickup unit for generating and directing the optical signals onto the optical medium, and for detecting corresponding reflected optical signals from the optical medium;

adjusting a defocus value of the optical signals on the optical medium by moving a focusing lens on the optical pickup; and

during write operations of the optical recording apparatus, performing write defocus calibration on the optical medium to determine an optimal write defocus value for the optical medium.

[Claim 14] 14. The method of claim 13, further comprising determining an optimal read defocus value for the optical medium during read operations of the optical recording apparatus.

[Claim 15] 15. The method of claim 13, wherein the optical medium is an optical disc having multiple layers; and the method further comprises during write operations of the optical recording apparatus on a particular layer of the optical disc, performing write defocus calibration on the particular layer of the optical disc to determine the optimal write defocus value for the particular layer of the optical disc.

[Claim 16] 16. The method of claim 13, further comprising storing a plurality of mappings relating different types of optical media to different write defocus values in the optical recording apparatus.

[Claim 17] 17. The method of claim 16, further comprising during write operations of the optical recording apparatus, performing the write defocus calibration starting from a starting write defocus value being a write defocus value stored in the optical recording apparatus corresponding to the type of the optical medium.

[Claim 18] 18. The method of claim 17, further comprising if the optical recording apparatus does not include a write defocus value stored therein corresponding to the type of the optical medium, performing the write defocus calibration starting from an optimal read defocus value corresponding to the type of the optical medium or starting from a default defocus value.

[Claim 19] 19. The method of claim 17, further comprising during write defocus calibration on the optical medium, gathering a data set relating write power of the optical signals to performance indicators at each of a plurality of different defocus values by performing a plurality of optimal power calibrations at each of the different defocus values, wherein one of the different defocus values is the starting write defocus value.

[Claim 20] 20. The method of claim 19, wherein the optical medium is an optical disc, and the method further comprises performing the optimal power calibrations in any area of the optical disc.

[Claim 21] 21. The method of claim 19, wherein the performance indicators include jitter or a block error rate of the reflected optical signals from the optical medium.

[Claim 22] 22. The method of claim 19, further comprising during write defocus calibration on the optical medium, choosing the optimal write defocus value according to the data set, the optimal write defocus value being a particular defocus value of the different defocus values of the data set having an optimal combined performance criteria.

[Claim 23] 23. The method of claim 17, further comprising if the optimal write defocus value resulting from the write defocus calibration is different than the starting write defocus value, updating the optical storage apparatus by storing an updated write defocus value for the type of the optical medium in the optical storage apparatus.

[Claim 24] 24. The method of claim 23, wherein the updated write defocus value for the type of the optical medium is a value between the starting write defocus value and the optimal write defocus value.